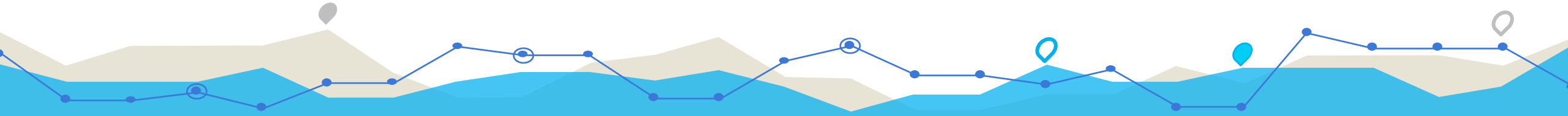
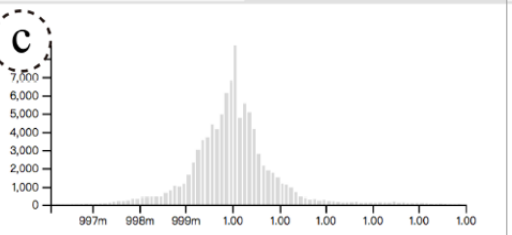
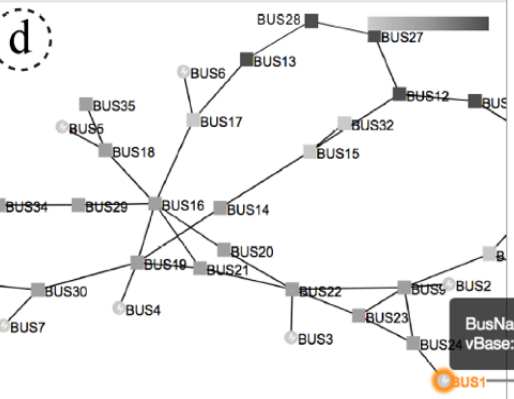


EEVis 项目介绍

Histogram of Frequency | Histogram of Voltage



Topological View of Power Grids



Analysis Result Report

e

Fault Type: Grounding of bus bars

Sample: 1

Overall Stability

○ Stable ◉ Unstable

Unstable Pattern

○ First-swing instability ◉ Periodic instability

Stability of Voltage

○ Large ○ Keep Vibrating ◉ Keep Stable

Stability of Frequency

○ Large ◉ Keep Vibrating ○ Keep Stable

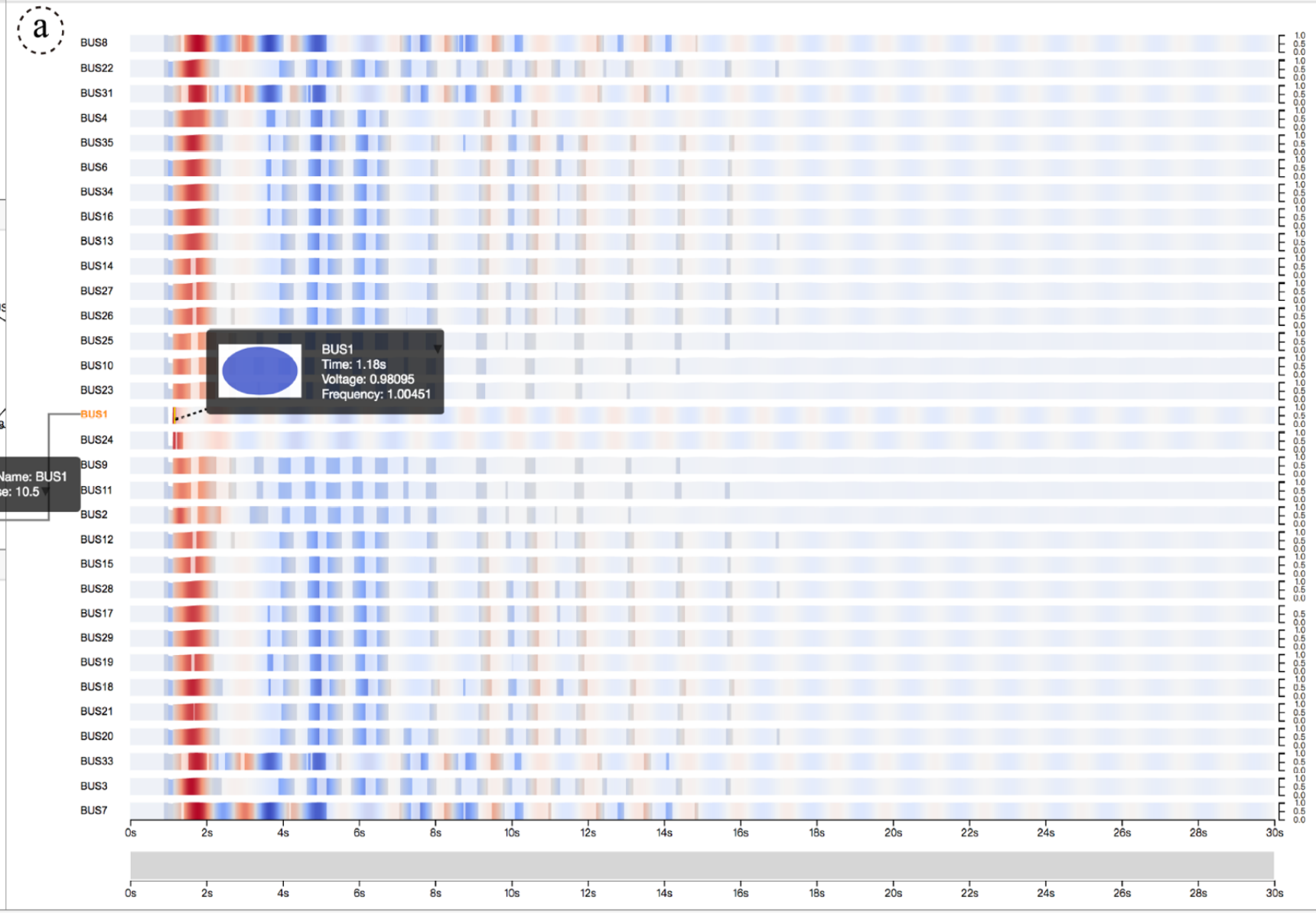
Stability of Rotor Angle

○ Large ◉ Keep Vibrating ○ Keep Stable

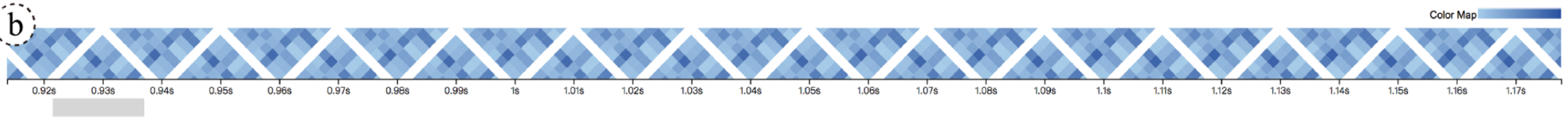
Reason: grounding of bus 1

Save

WaveLines



Half-Matrix of Pairwise Rotor Angle of Generators



Operation Panel

f

Data Configuration

Fault Type

◉ Grounding of bus
○ Disconnection of AC line
○ Exit of Generator
○ Line-to-ground Fault
○ Parameter Setting Error

Fault Location

Sample 1

Variable Pair

◉ Voltage and Frequency
○ Mean and Variance of Abs of Pairwise Rotor Angle

☐ Difference mode

Sorting

☐ Bottom-up order

Visual Encoding

◉ WaveLines
○ Stacked WaveLines
○ Ellipse WaveLines

Opacity

0 — 1

Color Map

0.998 1.000 1.002 1.004

☐ Color Equalization

Non-Linear Transformation

☐ Sqrt ☐ Log

Statistical Quality Control View

Voltage | Frequency

☑ Shewhart

Window Size 10

Mean K 1

Range K 0.25 Set

☐ CUSUM

Threshold 1.0 Set

☐ Show Upper Wave

☐ Show Lower Wave

背景和目的

电力行业通常用电压、频率、发电机间的相对功角来评判电网是否稳定，任何一个物理量的失稳（表现为数值的震荡变化）都可能导致整个系统的失稳。本系统主要通过支持对电力仿真数据的浏览和交互来帮助用户解决下述三个问题：

- 一个电力系统在遭受故障、冲击的前后是否能保持稳定
- 失稳系统的类型识别：第一摆失稳或周期性失稳
- 探究失稳原因

贡献点

贡献点主要有三：

- 支持探索、识别、推理电力网络的异常性、不稳定性及故障的可视分析系统
- 基于 Statistic Quality Control (SQC) 的可视化表达
- 对不同数据规模下的数值时序数据的可视化设计
  - 采用三种不同的视图对两种不同的变量对进行可视化，以同时展现变量间的关联关系

WaveLines: Interactive Visual Analysis of Stability in Transient Simulation Data of Power Grids